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EXAMINER	
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ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/511,227	PINCEMIN, ERWAN	
	Examiner	Art Unit	
	LI LIU	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 October 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 4/30/2008 have been fully considered but they are not persuasive. The examiner has thoroughly reviewed Applicant's amendment and arguments but firmly believes that the cited reference reasonably and properly meet the claimed limitation as rejected.

1). Applicant's argument – " *Hatami-Hanza* thus fails to teach the claimed birefringent propagating medium into which WDM signals having pulses which are simultaneous and carried at different wavelengths are injected, as recited in amended independent claims 1 and 9". "independent claims 2 and 10 are directed to a demultiplexing device and method, respectively, for retrieving WDM signals having pulses which are simultaneous and carried at different wavelengths. With no teaching or suggestion of the claimed birefringent propagating medium for multiplexing the claimed WDM signals, it is beyond dispute that *Hatami-Hanza* also fails to teach or suggest the demultiplexing device and method of respective independent claims 2 and 10."

Examiner's response – In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Suzuki et al teaches a WDM to OTDM conversion in which a wavelength converter 20 with absorption type optical modulator is used to convert four wavelength

$\lambda 1$ - $\lambda 4$ WDM signals into a single wavelength $\lambda 5$ OTDM signals ($\lambda 5$ can be also equal to one of the wavelength $\lambda 1$ to $\lambda 4$, [0040]) (Figures 1 and 3). Suzuki et al also teaches that similar device can be used to perform the opposite conversion: OTDM to WDM conversion (Figures 4, 6 and 7), and the wavelength converter with absorption type optical modulator is used to convert a single wavelength $\lambda 5$ OTDM signals into four $\lambda 1$ - $\lambda 4$ WDM signals.

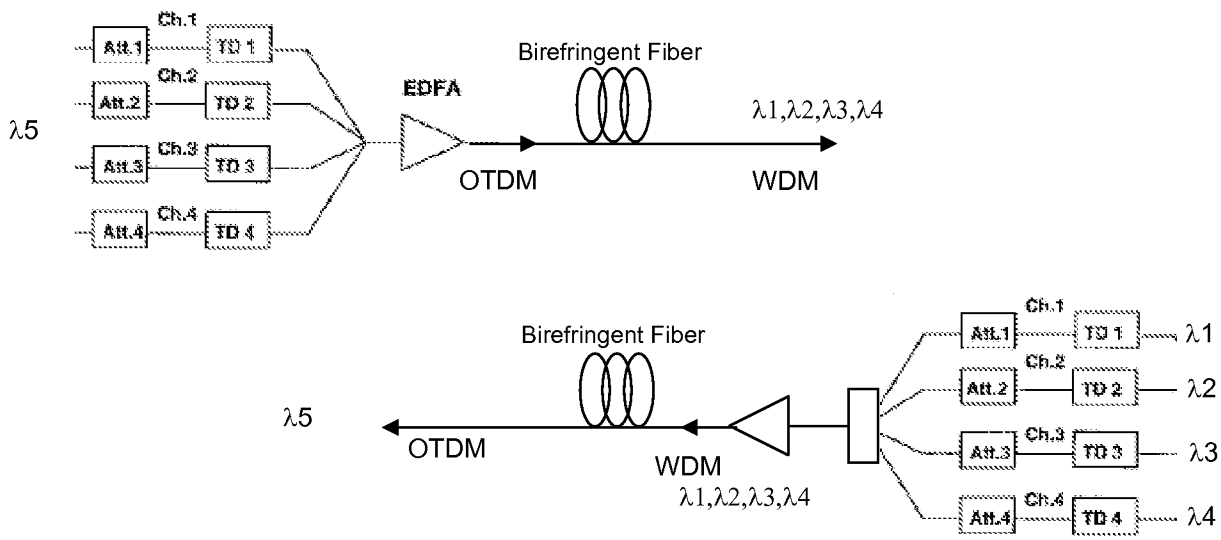

Figure O1

Hatami-Hanza et al teaches a birefringent propagating medium (e.g., the Fiber Span in Figure 1), and the OTDM signals with a signal wavelength are injected in the birefringent propagating medium to achieve a soliton trapping phenomenon (page 834, Figure 2, the pulse shape is not deformed but the frequency shift occurs, and the amount of shift depends on the pulse peak power), and then a WDM signals with four

wavelength are obtained. In Figures 1 and 2, Hatami-Hanza et al shows OTDM to WDM conversion.

As disclosed by Suzuki et al, a wavelength converter can be used to convert OTDM to WDM, and same type of wavelength converter can also be used to convert WDM to OTDM.

Based on the non-linear optical theory, and also indicated by Hatami-Hanza et al, the amount of frequency shift depends on the pulse peak power. As shown in the top panel of Figure O1, the pulse power level can be controlled by the attenuator (Att. in Figure O1) and the timing position of the pulse is controlled by the time delay (TD in Figure O1), and then through the birefringent fiber, the single wavelength OTDM signals are converted into WDM signals having four different wavelength. It is obvious to one skilled in the art to use the same principle and the birefringent propagating medium of Hatami-Hanza et al to convert the WDM signal to OTDM signal. As shown in the bottom panel of Figure O1, the attenuator (Att.) and time delay (TD) can be used to control the power level and timing position of the pulses of the WDM signals which are simultaneous and carried at the different wavelengths, then the birefringent fiber can be used to convert the four-wavelength WDM signal into single wavelength OTDM signals.

Therefore, the combination of Suzuki et al and Hatami-Hanza et al teaches and reasonably suggests “the claimed birefringent propagating medium into which WDM signals having pulses which are simultaneous and carried at different wavelengths are injected, as recited in amended independent claims”.

2). Applicant's argument – "*Hatami-Hanza* (pg. page 1, 1st CO1.) explains that it is very difficult to use the system at bitrates of greater than 40 Gbit/s and, thus teaches away from the claimed invention by expressly noting that its system only processes signals at 40 Gbit/s and below. There is accordingly no teaching or suggestion in the *Hatami-Hanza* document of any solution to this problem".

Examiner's response – First, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the system at bitrates of greater than 40 Gbit/s) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Second, Hatami-Hanza et al clearly states that the system can be used for 40 Gb/s data rate (page 833 right column and page 835 IV Conclusion). So, Hatami-Hanza et al does not teach away from the claimed invention.

3). Applicant's argument – "There is simply nothing in *Sugarawa* to cure the above-discussed deficiencies in *Suzuki and Hatami-Hanza* relating to the lack of teachings inter alia, of applicants' claimed birefringent propagating medium". "There is simply nothing in *Islam* or *Horiuchi* to cure the above-discussed deficiencies in *Suzuki, Hatami-Hanza and Sugarawa* relating to the lack of teachings of, *inter alia,* applicants' claimed birefringent propagating medium".

Examiner's response – As discussed above, Hatami-Hanza et al clearly discloses the "claimed birefringent propagating medium" (the optical fiber).

Drawings

2. The drawings are objected to because:

1). In Fig. 1, "(λ_1, I_s)(t_1, t_2, t_3, t_4)" should be changed to "(λ_4, I_s)(t_1, t_2, t_3, t_4)".

2). In Fig. 2, each pulse of the individual wavelength signal occupy 100 ps time slot before the multiplexer 120, but, after the multiplexer, the pulses occupy 25 ps time slot. According to the disclosure, the delay lines and the attenuators do not compress the pulse. The pulses of each wavelength should occupy 25 ps time slot also before the multiplexer 120.

3). Fig. 6, the bottom panel of third column, the label of horizontal axis should be "F", that is, an I vs F plot, not I vs t plot, since the V1 to V4 are frequencies.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

1). Claim 1, and thus the dependent claims 4-8, recites the limitation "a birefringent propagation medium into which the WDM signals having the pulses which are simultaneous and carried at the different wavelengths are injected to achieve soliton trapping" at lines 12-14. However, according to the original disclosure, after the time delay lines (102-104), the WDM signals are no longer having the pulses which are <u>simultaneous</u>. The inputting pulses to the delay lines are simultaneous, but after the delay lines, the signals are OTDM signals, the pulses are not "simultaneous". The original disclosure does not describe a birefringent propagation medium into which the

WDM signals having the pulses which are simultaneous and carried at the different wavelengths are injected to achieve soliton trapping.

2). Claim 2, and thus the dependent claims 3 and 12-16, recites the limitation “modulation means configured to modify optical power of the WDM signals having the pulses which are simultaneous and carried at the different wavelengths” at line 12-14. However, according to the original disclosure, after the absorption means and birefringent propagation medium, WDM signals are obtained, and then the signals are demultiplexed; but, the signals are not necessarily having the pulses which are <u>simultaneous</u>. After the demultiplexer, only if delay lines are used, the pulses of the WDM signals can be rendered simultaneous (page 12, lines 20-24). The original disclosure does not describe that the absorption means and birefringent propagation medium and demultiplexer can be configured to obtain the WDM signals having the pulses which are <u>simultaneous</u>.

3). Claim 9 recites the limitation “spectrally and temporally multiplexing the WDM signals having the pulses which are simultaneous and carried at the different wavelengths” at lines 11-12. However, according to the original disclosure, after the time shifting the pulses, the WDM signals are no longer having the pulses which are <u>simultaneous</u>. The inputting pulses to the delay lines are simultaneous, but after the delay lines, the signals are OTDM signals, the pulses are not “simultaneous". The original disclosure does not describe to spectrally and temporally multiplex the WDM signals having the pulses which are simultaneous and carried at the different wavelengths.

4). Claim 10, and thus the dependent claim 11, recites the limitation "recover a WDM signals having the pulses which are simultaneous and carried at the different wavelengths" at lines 10-12. However, according to the original disclosure, after the attenuators and birefringent propagation medium, WDM signals are obtained; but, the signals are not necessarily having the pulses which are <u>simultaneous</u>. After the demultiplexer, only if delay lines are used, the pulses of the WDM signals can be rendered simultaneous (page 12, lines 20-24). The original disclosure does not describe that the attenuators and birefringent propagation medium can be configured to get the WDM signals having the pulses which are <u>simultaneous</u>.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 4, 5, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (US 2002/0126346) in view of Hatami-Hanza et al (Hatami-Hanza et al: "Demonstration of All-Optical Demultiplexing of a Multilevel Soliton Signal Employing Soliton Decomposition and Self-Frequency Shift", IEEE Phtonics Technology Letters, Vol. 9, No. 6, July 1997, pages 833-835) and Sugawara (US 2003/0058500).

1). With regard to claims 1 and 9, Suzuki et al discloses an optical device and a method (e.g., Figure 1) for converting wavelength division multiplex (WDM) signals (e.g., four wavelengths in Figures 1and 3) having the pulses of which are simultaneous and carried at different wavelengths ($\lambda 1$, $\lambda 2$, $\lambda 3$, $\lambda 4$ in Figures 1 and 3), into an optical time division multiplexing/demultiplexing (OTDM) signal (Figures 1 and 3, OTDM signal is outputted from the O-BPF 30) having components which are carried at a same wavelength ($\lambda 5$, in Figures 1 and 3; in Suzuki et al's system, $\lambda 5$ is as the outputted wavelength for the OTDM signal, however, Suzuki et al also states that other wavelength same as the input light can also be used, page 3, [0041]) and time shifted (the Delay device 14-1 to 14-4 delay the optical signals), which device comprises:

shifting means (the Delay device 14-1 to 14-4 in Figures 1 and 3) configured to introduce a time shift between the pulses of the WDM signals which are simultaneous and carried at different wavelengths by optical carriers ($\lambda 1$, $\lambda 2$, $\lambda 3$, $\lambda 4$ in Figures 1 and 3, [0044]),

an optical spectral and temporal multiplexer/demultiplexer (the multiplexer 16 in Figures 1 and 3).

But, Suzuki et al uses an absorption type optical modulator (20 in Figure 1) as a wavelength converter. Suzuki et al does not expressly disclose (A) modulation means adapted to modify the optical power of the WDM signals, (B) a birefringent propagation medium (130) into which the WDM signals having the pulses which are simultaneous and carried at the different wavelengths are injected to achieve a soliton trapping, and

(C) absorption means configured to introduce optical losses into the components of the OTDM signal.

With regard to items (A) and (B), however, Hatami-Hanza et al discloses a system and method to convert the OTDM signal to a WDM signal (Figure 1). Hatami-Hanza et al teaches modulation means (the attenuators Att.1 to Att.4 in Figure 1) adapted to modify the optical power of the OTDM signals, shifting means to introduce a time shift between the pulses of the WDM signals, a birefringent propagation medium (the Fiber Spans in Figure 1) into which the OTDM signals are injected in such a manner as to achieve a soliton trapping phenomenon (page 834, Figure 2, the pulse shape is not deformed but the frequency shift occurs, and the amount of shift depends on the pulse peak power). Although Hatami-Hanza et al teaches the conversion from the OTDM signals to WDM signals, it is obvious that same system can be used to convert the WDM signals to the OTDM signals since the basic principle is the same. As discussed in the Response to Arguments and shown in the top panel of Figure O1 above, the pulse power level can be controlled by the attenuator (Att. in Figure O1) and the timing position of the pulse is controlled by the time delay (TD in Figure O1), and then through the birefringent fiber, the single wavelength OTDM signals are converted into WDM signals having four different wavelength. It is obvious to one skilled in the art to use the same principle and the birefringent propagating medium of Hatami-Hanza et al to convert the WDM signal to OTDM signal. As shown in the bottom panel of Figure O1, the attenuator (Att.) and time delay (TD) can be used to control the power level and timing position of the pulses of the WDM signals which are simultaneous and carried at

the different wavelengths, then the birefringent fiber can be used to convert the four-wavelength WDM signal into single wavelength OTDM signals.

Hatami-Hanza et al teaches a simplified WDM/OTDM multiplexing/demultiplexing system. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the multilevel solion method and a birefringent propagation medium as taught by Hatami-Hanza et al to the system of Suzuki et al so that a simplified WDM/OTDM conversion system can be obtained.

With regard to item (C), the absorption means adapted to equalize the powers of the optical pulses is well known and widely used in the art. Sugawara teaches a system and method (Figures 7 and 8) in which the optical pulses are reshaped so that each pulse has substantially same power.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the power equalizing means as taught by Sugawara to the system of Suzuki et al and Hatami-Hanza et al so that each OTDM pulse has substantially the same intensity and then the system is more uniform and more reliable, and the jitter, noise and variation in the intensity etc can be reduced.

2). With regard to claim 4, Suzuki et al and Hatami-Hanza et al and Sugawara disclose all of the subject matter as applied to claim 1 above. And Suzuki et al and Hatami-Hanza et al further disclose wherein the shifting means comprise variable delay lines (Suzuki et al: page 4, [0044]; or Hatami-Hanza et al: page 833 right column, II. Experimental Results)

3). With regard to claim 5, Suzuki et al and Hatami-Hanza et al and Sugawara disclose all of the subject matter as applied to claim 1 above. And Hatami-Hanza et al further disclose wherein the modulation means comprise variable attenuators (page 834, left column).

4). With regard to claim 8, Suzuki et al and Hatami-Hanza et al and Sugawara and Horiuchi et al disclose all of the subject matter as applied to claims 1 and 2 above. And Suzuki et al and Hatami-Hanza et al and Sugawara and Horiuchi et al further disclose wherein the absorption means comprise a saturable absorber (Sugawara teaches a saturable absorber).

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al and Hatami-Hanza et al and Sugawara as applied to claim 1 above, and in further view of Horiuchi et al (US 5,726,789).

Suzuki et al and Hatami-Hanza et al and Sugawara disclose all of the subject matter as applied to claim 1 above. But, Suzuki et al and Hatami-Hanza et al and Sugawara does not expressly disclose wherein the absorption means comprise an electro-absorption modulator.

However, to use the electro-absorption modulator (EAM or MEA) to reshape an optical pulse is well known in the art. It is well known that the intensity of the pulse outputted from an EAM (or MEA) depends on the applied electric voltage. Horiuchi et al teaches such EAM; and in Figures 6, 11 and 12, Horiuchi et al shows how the intensity of the outputted pulses varies with the control signals (the sinusoidal voltage in Figure 6, or the signal shown in Fig 11(b)).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an electro-absorption modulator as widely used in the art to the system of Suzuki et al and Hatami-Hanza et al so that a simplified power control device and WDM/OTDM conversion system can be obtained.

8. Claims 2, 3, 10-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (US 2002/0126346) in view of Hatami-Hanza et al (Hatami-Hanza et al: “Demonstration of All-Optical Demultiplexing of a Multilevel Soliton Signal Employing Soliton Decomposition and Self-Frequency Shift”, IEEE Phtonics Technology Letters, Vol. 9, No. 6, July 1997, pages 833-835) and Horiuchi et al (US 5,726,789).

1). With regard to claims 2 and 10, Suzuki et al discloses an optical device and a method (e.g., Figures 4 and 6) for converting an optical time division multiplexing/demultiplexing (OTDM) signal having components which are time shifted (Figures 1 and 3, the Delay device 14-1 to 14-4 delay the optical signals) and carried at a same wavelength (λ5, in Figures 1 and 3; in Suzuki et al’s system, λ5 is as the outputted wavelength for the OTDM signal, however, Suzuki et al also states that other wavelength same as the input light can also be used, page 3, [0041]) into wavelength division multiplex (WDM) signals (Figures 4 and 6, the output from “C” of the circulator 42 is the WDM signals) having pulses which are simultaneous and carried at different wavelengths (λ1, λ2, λ3, λ4, Figures 4 and 6), which device comprises:

wavelength converter (the combination of 44, 46, 48 and 50 etc in Figures 4 and 6),

an optical spectral and temporal multiplexer/demultiplexer (Demultiplexer 56 in Figures 4 and 6).

But, Suzuki et al uses an absorption type optical modulator (44, 46, 48 and 50 etc in Figures 4 and 6) as a wavelength converter. Suzuki et al does not expressly disclose (A) absorption means configured to introduce optical losses into the components of the OTDM signal, (B) a birefringent propagation medium into which the OTDM signal having the components which are time shifted and carried at the same wavelength is injected in such a manner as to achieve a soliton trapping, (C) modulation means adapted to modify the optical power of the WDM signals having the pulses which are simultaneous and carried at the different wavelengths.

With regard to items (A) and (B), Hatami-Hanza et al discloses a system and method to convert the OTDM signal into a WDM signal (Figure 1). Hatami-Hanza et al teaches absorption means (the attenuators Att.1 to Att.4 in Figure 1) configured to introduce optical losses into the components of the OTDM signal, and a birefringent propagation medium (the Fiber Spans in Figure 1) into which the OTDM signal having the components which are time shifted and carried at the same wavelength (1547.5 nm) is injected in such a manner as to achieve a soliton trapping (page 834, Figure 2).

Hatami-Hanza et al teaches a simplified WDM/OTDM multiplexing/demultiplexing system. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the multilevel solion method and a birefringent propagation medium as taught by Hatami-Hanza et al to the system of Suzuki et al so that a simplified OTDM/WDM conversion system can be obtained.

But, in Hatami-Hanza et al's system, four attenuators are used to control the power of the individual pulse. Hatami-Hanza et al does not expressly teach to use a single device to control the power of the individual pulse of the OTDM signal. However, to use a single device, such as the electro-absorption modulator (EAM or MEA), to reshape an optical pulse is well known in the art. It is well known that the intensity of the pulse outputted from an EAM (or MEA) depends on the applied electric voltage. Horiuchi et al teaches such EAM; and in Figures 6, 11 and 12, Horiuchi et al shows how the intensity of the outputted pulses varies with the control signals (the sinusoidal voltage in Figure 6, or the signal shown in Fig 11(b)).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an electro-absorption modulator as widely used in the art to the system of Suzuki et al and Hatami-Hanza et al so that a simplified power control device and WDM/OTDM conversion system can be obtained.

With regard to item (C), modulation means, such as the variable optical attenuator, to modify the optical power of the WDM signals is well known and widely used in the art. In Figure 1 of Hatami-Hanza et al, attenuators are used to adjust the power of different channels, it is obvious that the same attenuators can be used in the receiver side for the WDM signals, so that the desired power of the different wavelength can be obtained.

2). With regard to claims 3 and 11, Suzuki et al and Hatami-Hanza et al and Horiuchi et al disclose all of the subject matter as applied to claim 2 above. But, Suzuki et al and Hatami-Hanza et al and Horiuchi et al do not expressly disclose shifting means

configured to introduce a time shift between the pulses of the WDM signals carried by the optical carriers. However, Suzuki et al teaches shifting means adapted to introduce a time shift between the pulses of the WDM signals in the transmitter side for WDM to OTDM conversion, it is obvious that the same shifting means can be used in the receiver side for the WDM signals after the OTDM to WDM conversion.

3). With regard to claim 12, Suzuki et al and Hatami-Hanza et al and Horiuchi et al disclose all of the subject matter as applied to claim 2 above. And Suzuki et al and Hatami-Hanza et al further disclose wherein the shifting means comprise variable delay lines (Suzuki et al: page 4, [0044]; or Hatami-Hanza et al: page 833 right column, II. Experimental Results)

4). With regard to claim 13, Suzuki et al and Hatami-Hanza et al and Horiuchi et al disclose all of the subject matter as applied to claim 2 above. And Hatami-Hanza et al further disclose wherein the modulation means comprise variable attenuators (page 834, left column).

5). With regard to claim 15, Suzuki et al and Hatami-Hanza et al and Horiuchi et al disclose all of the subject matter as applied to claim 2 above. And Suzuki et al and Hatami-Hanza et al and Horiuchi et al further disclose wherein the absorption means comprise an electro-absorption modulator (Horiuchi et al: EAM is used as pulse reshaping).

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al and Hatami-Hanza et al and Horiuchi et al as applied to claim 2 above, and in further view of Sugawara (US 2003/0058500).

Suzuki et al and Hatami-Hanza et al and Horiuchi et al disclose all of the subject matter as applied to claim 2 above. But, Suzuki et al and Hatami-Hanza et al and Horiuchi et al do not expressly disclose that the absorption means comprise a saturable absorber.

However, the absorption means used to equalize the powers of the optical pulses is well known and widely used in the art. Sugawara teaches a system and method (Figures 7 and 8) in which the optical pulses are reshaped so that each pulse has substantially same power.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the power equalizing means as taught by Sugawara to the system of Suzuki et al and Hatami-Hanza et al so that each OTDM pulse has substantially the same intensity and then the system is more uniform and more reliable, and the jitter, noise and variation in the intensity etc can be reduced.

10. Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al and Hatami-Hanza et al and Sugawara and Horiuchi et al as applied to claims 1 and 2 above, and in further view of Islam et al (Islam et al: “Soliton Trapping in Birefringent Optical Fibers”, Optics Letters, September 15, 1989, pages 1011-1013).

Suzuki et al and Hatami-Hanza et al and Sugawara and/or Horiuchi et al disclose all of the subject matter as applied to claims 1 and 2 above. But, Suzuki et al and Hatami-Hanza et al does not disclose that the system further comprises a polarization controller at the entry of the birefringent propagation medium to encourage the injection

of WDM/OTDM signals into said propagation medium with a polarization at 45 degree to its main axes of the birefringent propagation medium.

However, Islam et al teaches system for soliton trapping in birefringent optical fiber; and the optical signal is injected into the birefringent optical fiber with a polarization at 45 degree to its main axes (Figures 1 and 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the injection of the optical signal with 45 degree along the principle axis as taught by Islam et al to the system of Suzuki et al and Hatami-Hanza et al and Sugawara and Horiuchi et al so that a desired soliton trapping and wavelength shift can be obtained.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wachsman (US 6,614,583).

Suzuki et al (US 5,889,607).

Reingand et al (US 2003/0058490).

Olsson et al: “WDM to OTDM Multiplexing Using an Ultrafast All-Optical Wavelength Converter”, IEEE Photonics Technology Letters, Vol. 13, No. 9, September 2001, pages 1005-1007.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LI LIU whose telephone number is (571)270-1084. The examiner can normally be reached on Mon-Fri, 8:00 am - 5:30 pm, alternating Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Li Liu
August 10, 2008

/Kenneth N Vanderpuye/
Supervisory Patent
Examiner, Art Unit 2613